

ABSTRACT OF THE DISCLOSURE

Flip-chip packaging for optically interactive devices such as images sensors and methods of assembly. In a first embodiment of the invention, conductive traces are formed directly on the second surface of a transparent substrate and an image sensor chip is bonded to the conductive traces. Discrete conductive elements are attached to the conductive traces and extend below a back surface of the image sensor chip. In a second embodiment, a secondary substrate having conductive traces formed thereon is secured to transparent substrate. In a third embodiment, a backing cap having a full array of attachment pads is attached to the transparent substrate of the first embodiment or the secondary substrate of the second embodiment. In a fourth embodiment, the secondary substrate is a flex circuit having a mounting portion secured to the second surface of the transparent substrate, and a backing portion bent over adjacent to the back surface of the image sensor chip.